Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-13. (Cancelled)

14. (Currently Amended) A quantum well structure for the absorption or emission of photons comprising [[a]] quantum well ~~layer~~ layers (7; 107; 207; 301) ~~arranged~~ stacked in a stacking direction between [[two]] barrier layers (9, 11; 109, 112; 209, 212; 303), configured such that after emission of a photon from an electron, said electron goes from a high energy level to low energy value in a quantum well layer and such that after absorption of a photon by an electron, said electron originates in a low energy level in a quantum well layer, wherein at least one of the barrier layers (9, 11; 109, 112; 209, 212; 303) comprises nanostructures (10; 110; 210; 310) arranged such that said nanostructures ~~which~~ cancel or modulate a ~~lateral~~ homogeneity of said quantum well layer extending in at least one lateral direction in the absence of said nanostructures, without substantially influencing energy values in said quantum well layers, ~~of the barrier layer (9; 109; 209; 303D), which is present without the nanostructures (10; 110; 210; 310), characterised in that~~ wherein the quantum well layer (7; 107; 207; 301) is in the form of an absorption or emission layer for the absorption or emission of the photons, and wherein said at least one lateral direction extends perpendicularly to the stacking direction of said layers.

15. (Currently Amended) A quantum well structure as set forth in claim 14 ~~characterised in that~~ wherein the quantum well layer ~~(7; 107; 207; 301)~~ comprises an energy band with energy levels of differing energy, wherein the energy values of the energy levels are so adjusted that the absorption or emission of photons occurs with a given wavelength.

16. (Currently Amended) A quantum well structure as set forth in claim 14 ~~characterised in that self-organised~~ wherein said nanostructures are self-organized three-dimensional structures ~~(10; 110; 210; 310) are present as nanostructures~~.

17. (Currently Amended) A quantum well structure as set forth in claim 16 ~~characterised in that the self-organised~~ wherein said self-organized three-dimensional structures ~~(10; 110; 210; 310)~~ are made from a material which has a greater lattice constant than the material of the barrier layer ~~(9; 109; 209; 303D)~~.

18. (Currently Amended) A quantum well structure as set forth in claim 16 ~~characterised in that the self-organised~~ wherein said self-organized three-dimensional nanostructures ~~(10; 110; 210; 310)~~ are in the form of quantum dots.

19. (Currently Amended) A quantum well structure as set forth in claim 16 ~~characterised in that the self-organised~~ wherein said self-organized three-dimensional nanostructures ~~(10; 110; 210; 310)~~ are in the form of quantum wires.

20. (Currently Amended) A quantum well structure as set forth in claim 14 ~~characterised in that~~ wherein at least one of the barrier layers is in the form of an aluminum arsenide layer ~~(9; 109; 303D) which includes~~ having indium arsenide islands ~~(10; 110; 310)~~ as nanostructures.

21. (Currently Amended) A quantum well structure as set forth in claim 14 ~~characterised in that~~ wherein at least one of the barrier layers is in the form of an indium phosphide layer ~~(209) which includes~~ having indium arsenide islands ~~(210)~~ as nanostructures.

22. (Currently Amended) A quantum well structure as set forth in claim 14 ~~characterised in that it comprises~~ comprising at least two quantum well layers ~~(7; 107; 207; 301) which are each~~ separated from each other at least by a respective barrier layer ~~(9, 11; 109, 112; 209, 212; 303)~~.

23. (Currently Amended) A quantum well structure as set forth in claim 14 ~~characterised in that~~ wherein the nanostructures ~~(10; 110; 210; 310)~~ are of a dimension of less than 50 nm in at least one lateral direction in which they extend.

24. (Currently Amended) A quantum well structure as set forth in claim 23 ~~characterised in that the~~ wherein said dimension is in the range of between 5 and 15 nm.

25. (Previously Presented) A quantum well photodetector comprising at least one quantum well structure as set forth in claim 14.

26. (Previously Presented) A quantum cascade laser comprising at least one quantum well structure as set forth in claim 14.

27. (New) A quantum well structure for the absorption or emission of photons comprising quantum well layers have different energy values;

means for absorbing or emitting photons from an electron undergoing an intersubband transition in said quantum well layers;

means for cancelling or modulating homogeneity of electron density distribution in said quantum well layers without substantially influencing said energy values of the quantum well layers;

wherein said quantum well layers are stacked in a stacking direction between barrier layers, and

wherein said barrier layers comprise nanostructures configured to cancel or modulate the homogeneity of electron density distribution extending in at least one direction perpendicular to the stacking direction of said quantum well layers in the absence of said nanostructures.

28. (New) A method of forming an improved quantum well structure, comprising providing a plurality of quantum well layers separated by barrier layers stacked in a stacking direction wherein the improvement comprises:

configuring said quantum well structure such that electrons undergo intersubband transitions and emit or absorb photons in said quantum well layers wherein electrons tunnel through barrier layers and go from an energy level at a high energy value to an energy level at a low energy value in a first quantum well layer and emit a photon in said first quantum well layer or electrons originate from an energy level at low energy value in a second quantum well layer to absorb a photon in said second quantum well layer; and

providing means for cancelling or modulating homogeneity of electron density distribution in said quantum well layers, wherein said means comprises nanostructures configured to cancel or modulate the homogeneity of electron density distribution extending in at least one direction perpendicular to the stacking direction of said quantum well layers in the absence of said nanostructures, wherein said nanostructures do not substantially influence the energy values of said quantum well layers.

29. (New) A method for absorbing or emitting photons from intersubband transitions in a quantum well structure comprising,

providing a plurality of quantum well layers separated by barrier layers stacked in a stacking direction;

configuring said quantum well structure such that electrons undergo intersubband transitions and emit or absorb photons in said quantum well layers

wherein electrons tunnel through barrier layers and go from an energy level at a high energy value to an energy level at a low energy value in a first quantum well layer and emit a photon in said first quantum well layer or electrons originate from an energy level at low energy value in a second quantum well layer to absorb a photon in said second quantum well layer; and

providing a means for cancelling or modulating homogeneity of electron density distribution in said quantum well layers, wherein said means comprises nanostructures configured to cancel or modulate the homogeneity of electron density distribution extending in at least one direction perpendicular to the stacking direction of said quantum well layers in the absence of said nanostructures, wherein said nanostructures do not substantially influence the energy values of said quantum well layers.

30. (New) A method for permitting an electron to absorb or emit a photon in a quantum well layer of a quantum well structure comprising

providing quantum well layers having different energy values separated by barrier layers stacked in a stacking direction wherein said electron undergoes intersubband transitions in said quantum well layers, and

providing a means for cancelling or modulating homogeneity of electron density distribution in said quantum well layers, wherein said means comprises nanostructures configured to cancel or modulate the homogeneity of electron density distribution extending in at least one direction perpendicular to the stacking direction of said

quantum well layers in the absence of said nanostructures, wherein said nanostructures do not substantially influence the energy values of said quantum well layers,

wherein electrons tunnel through barrier layers and go from an energy level at a high energy value to an energy level at a low energy value in a first quantum well layer and emit a photon in said first quantum well layer or electrons originate from an energy level at low energy value in a second quantum well layer to absorb a photon in said second quantum well layer.